

CLAIMS

I claim:

1. A device for cleaning hoses comprising:
 - a) a reel unit which is sized to be accommodated on a vehicle and which includes
 - 1) a base which is rectangular and which has
 - (A) a fore end,
 - (B) a rear end, and
 - (C) first and second sides,
 - 2) first and second upright standards which are fixed to the first and second sides of the base respectively and which extend upward from a plane containing the base of said reel unit, each of the uprights
 - (A) being triangular with a base portion formed by the side of the base associated therewith,
 - (B) having an apex spaced apart from the plane containing the base of said reel unit, and
 - (C) the apexes of the upright standards being spaced apart from each other, and
 - 3) a hose storage reel mounted on the apexes of

the upright standards to rotate in a plane spaced from the plane containing the base of said reel unit;

b) a hose cleaning assembly on said reel unit and which includes

1) a swivel bracket plate mounted on one of the upright standards of the base of said reel unit and which includes a tubular sleeve having

(A) first and second ends,

(B) a bore extending between the first and second ends of the tubular sleeve and having an interior dimension,

(C) a vacuum supply tube extending through the bore in the tubular sleeve and having an outer dimension that is smaller than the interior dimension of the tubular sleeve so the vacuum supply tube is rotatable in the tubular sleeve from a first stored configuration extending over the hose storage reel to a second deployed configuration extending away from the hose storage reel, the vacuum supply tube including a

- first end and a second end,
- (D) a vacuum hose swivel cuff on the second end of the vacuum supply tube and which is fluidically connected to a vacuum source,
- (E) an elbow in the vacuum supply tube between the first and second ends of the vacuum supply tube,
- (F) a swivel connection on the first end of the vacuum supply tube, and
- (G) a vacuum manifold having an inlet end fluidically connected to the first end of the vacuum supply tube and connected to the swivel connection on the first end of the vacuum supply tube, the vacuum manifold including first and second outlet ports fluidically connected to the inlet end of the vacuum manifold,
- 3) a hose cleaning housing unit mounted on the vacuum manifold and which includes
 - (A) a hollow cylindrical housing which has
 - (i) first and second ends,
 - (ii) an inside surface defining an

inside volume in said hollow
cylindrical housing,

- (iii) a longitudinal axis which extends
between the first and second ends
of the hollow cylindrical housing,
and a radial dimension that extends
from the longitudinal axis to the
inside surface of the hollow
cylindrical housing in a plane that
is perpendicular to a plane
containing the longitudinal axis of
the hollow cylindrical housing,
- (iv) a first end cap on the first end of
the cylindrical housing of the hose
cleaning housing unit,
- (v) a second end cap on the second end
of the cylindrical housing of the
hose cleaning housing unit,
- (vi) a first vacuum connection port on
the first end of the hollow
cylindrical housing of the hose
cleaning housing unit fluidically
connected to the first outlet port
of the vacuum manifold,

- (vii) a second vacuum connection port on the second end cap of the hollow cylindrical housing of the hose cleaning housing unit fluidically connected to the second outlet port of the vacuum manifold,
- (viii) the vacuum source applying a vacuum pressure to the inside of the hollow cylindrical housing via the vacuum supply tube, and
- (ix) a debris storage element fluidically connected to the vacuum supply tube and to the inside of the hollow cylindrical housing,
- (B) a fluid manifold mounted on the hollow cylindrical housing near the first end of the hollow cylindrical housing and including a fluid inlet port fluidically connected to a source of hose cleaning fluid and a plurality of fluid outlet ports fluidically connected to the inlet port of the fluid manifold,
- (C) a plurality of fluid conduits, each fluid conduit having a first end

fluidically connected to an associated fluid outlet port of the fluid outlet ports of the fluid manifold and a second end spaced from the first end of the fluid conduit,

- (D) a plurality of connection mounts with each connection mount connecting the second end of an associated fluid conduit to the hollow cylindrical housing of the hose cleaning housing unit,
- (E) a plurality of fluid spray jets, each fluid spray jet mounted on the inside surface of the hollow cylindrical housing of the hose cleaning housing unit and fluidically connected to the second end of a fluid conduit associated with the fluid spray jet,
- (F) the fluid spray jets being spaced apart from each other along the radial dimension of the hollow cylindrical housing,
- (G) a plurality of hose cleaning brushes mounted on the inside surface of the

hollow cylindrical housing of the hose cleaning unit, the hose cleaning brushes being spaced apart from each other about the radial dimension of the hollow cylindrical housing, each hose cleaning brush of the plurality of hose cleaning brushes extending along the longitudinal axis of the hollow cylindrical housing,

(H) a plurality of hose support units inside the hollow cylindrical housing of the hose cleaning housing unit,

(i) the hose support units being spaced apart from each other along the longitudinal axis of the hollow cylindrical housing, and

(ii) each hose support unit including a base mounted on the hollow cylindrical housing inside the hollow cylindrical housing, a shock absorber spring in each base between the hollow cylindrical housing and the base so the base can move toward and away from the inside surface of the hollow

cylindrical housing, a bracket arm having a proximal end connected to the base and extending in the radial direction of the hollow cylindrical housing and having a distal end spaced from the inside surface of the hollow cylindrical housing, each hose support unit further including a bearing cage mounted on the distal end of each bracket arm, bearings connecting the bearing cage to the distal end of the bracket arm, the bearing cage being positioned to engage a hose located in the hollow cylindrical housing and being movable against the shock absorber spring between a first position and a second position with the first and second positions of the bearing cage being spaced apart from each other along the radial direction of the hollow cylindrical housing so hoses of various outer dimensional

sizes can be accommodated by the
hose supporting units,

- (I) a plurality of splash plates mounted on the inside surface of the hollow cylindrical housing and extending along the radial direction of the hollow cylindrical housing, each splash plate including a bore defined therethrough and a plurality of slits defined from the bore defined through the splash plate, the bore in each splash plate being circular and the slits extending radially away from the circular bore, the splash plate contacting a hose adjacent to the bore defined through the splash plate when the hose is located in the hollow cylindrical bore, the plurality of splash plates including a first splash plate located adjacent to the first end cap of the hollow cylindrical housing, a second splash plate located adjacent to the second end cap of the hollow cylindrical housing, a third splash plate located adjacent to

the first splash plate with the first splash plate being located between the third splash plate and the first end cap, and a fourth splash plate located adjacent to the third splash plate with the third splash plate being located between the fourth splash plate and the first splash plate,

- (J) a vacuum housing on the inside surface of the hollow cylindrical housing and extending along the longitudinal axis of the hollow cylindrical housing between the first and third splash plates and fluidically connected to the first vacuum connection port of the hollow cylindrical housing,
- (K) a jet manifold located inside the hollow cylindrical housing and fluidically connected to the second end of each fluid conduit of the hose cleaning housing unit and to the fluid spray jets of the hose cleaning housing unit and being located between the third and fourth splash plates,

- (L) a brush receiver housing located inside the hollow cylindrical housing between the second and fourth splash plates and
- (i) extending along the longitudinal axis of the hollow cylindrical housing,
 - (ii) including a first ring element located adjacent to the fourth splash plate, a second ring element located adjacent to the second splash plate,
 - (iii) a central ring located between the first and second ring elements of the brush receiver housing, and
 - (iv) the bases of the hose support units each being mounted on the central ring element of the brush receiver housing,
- (M) an assembly rod extending along the longitudinal axis of the hollow cylindrical housing and having one end connected to the first splash plate and another end connected to the second splash plate, and

(N) a hinged vacuum lid unit mounted on the second end cap of the hollow cylindrical housing and having a top lid and a bottom lid and a hinge connecting the top lid of the vacuum lid unit to the bottom lid of the vacuum lid unit with the top lid being movable with respect to the bottom lid between an open configuration spaced from the bottom lid to a closed configuration in contact with the bottom lid; and

- c) a fluid drain unit which includes
 - 1) a drain element fluidically connected to the hollow cylindrical housing near the second end of the hollow cylindrical housing,
 - 2) the drain element of the fluid drain unit being fluidically connected to the inside of the hollow cylindrical housing, and
 - 3) a drain storage unit which is fluidically connected to the drain element of the fluid drain unit.

2. The device for cleaning hoses as described in claim 1 further including a plurality of additional hose

brushes which are spaced apart from each other along the longitudinal axis of the hollow cylindrical housing.

3. The device for cleaning hoses as described in claim 1 further including a plurality of additional hose support units which are spaced apart from each other along the longitudinal axis of the hollow cylindrical housing.
4. The device for cleaning hoses as described in claim 1 further including a plurality of additional fluid spray jets which are spaced apart from each other along the longitudinal axis of the hollow cylindrical housing.
5. A unit for cleaning a hose comprising:
 - a) a hose reel; and
 - b) a hose cleaning assembly mounted on said hose reel and which includes
 - (1) a vacuum hose mounted on said hose reel to be movable between a first position and a second position,
 - (2) a hollow housing mounted on the vacuum hose and fluidically connected to the vacuum hose,

- (3) a hose cleaning jet spray unit in the housing,
 - (4) a hose supporting unit in the housing and which includes a spring shock absorber and is movable between a first position and a second position spaced from the first position inwardly of the hollow housing,
 - (5) a source of hose cleaning fluid fluidically connected to the hose cleaning jet spray unit,
 - (6) a hose cleaning brush unit in the hollow housing, and
 - (7) a vacuum source fluidically connected to the vacuum hose.
6. The unit as described in claim 5 further including a plurality of hose cleaning jet spray units.
7. The unit as described in claim 5 further including a plurality of hose supporting units.
8. The unit as described in claim 5 further including a plurality of hose cleaning brush units.